

PATENT SPECIFICATION

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(21) Application No. 31783/77 (22) Filed 28 July 1977

(44) Complete Specification published 6 June 1979

(51) INT. CL.² B26B 1/08 // 5/00

(52) Index at acceptance
B4B 130E

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(54) IMPROVEMENTS IN OR RELATING TO KNIVES

(71) We, NIPPON TENSHASHI KABUSHIKI KAISHA, a corporation organised and existing under the laws of Japan, of 172-6, Nakano-cho, Higashisumiyoshi-Ku, Osaka, Japan, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to a knife and is particularly concerned with a knife having a magazine for spare blades. Each blade is preferably obliquely scored with spaced parallel lines thereon, whereby a fresh edge or blade can be ejected from the holder when the one in use in the cutting process has become dull or blunt.

According to the present invention, therefore, there is provided a knife comprising a plurality of dispensable blades, each having a plurality of spaced parallel score lines disposed transversely thereof to define individual blade portions, a holder, a magazine adapted for insertion in said holder and including a case accommodating dispensable blades in side by side relationship, said holder being open on one side to expose a side of the nearest blade, blade dispensing means carried by said holder, a support base and biasing means associated with the magazine and adapted to urge the said nearest blade into cooperating engagement with the dispensing means so that individual blade portions can be sequentially dispensed by operation of the blade dispensing means.

The holder may have a longitudinal slot and the blade dispensing means may constitute a slider carried in said slot. The slider may have a spring loaded abutment adapted to engage a blade for progressive dispensing of the blade in response to movement of said slider and may include means for depressing the spring loading at

the forward extremity of the slider travel to disengage the abutment from said blade to permit removal of the spent blade from the holder.

In a further embodiment of the invention a detachable clip may be provided on the rear portion of the holder, the clip having a split or groove adapted to engage the blade for breaking used blade portion along the score line prior to dispensing the new blade portion from the holder.

Following is a description by way of example only and with reference to the accompanying drawings of methods of carrying the invention into effect.

In the drawings:—

Figure 1 is a front view of a preferred embodiment with the front wall of the holder partly broken away to expose the magazine and the blades according to the invention but partly broken away;

Figure 2 is a back view of the same in Figure 1 with parts in section;

Figure 3 is a top view of the same in Figure 1 with parts in section;

Figure 4 is a section view taken along line IV-IV in Figure 1;

Figure 5 is a left side view of the same in Figure 1;

Figure 6 is a right side view of the same in Figure 1;

Figure 7 is a perspective view showing a holder of the same in Figure 1;

Figure 8 is a front view of the same holder showing at its extreme portion the slider sheet means mounted on a groove side surface of the same holder;

Figure 9 is a like view of Figure 4 but with the same slider means in the forwardmost position;

Figure 10 is a perspective view showing renewal of the cutting edge by use of a clip according to this invention;

Figure 11 is a section view taken along line XI-XI in Figure 8;

Figure 12 is a top view of a slider sheet according to this invention;

Figure 13 is a front view of the side of the same which carries the hooks in Figure 12;

Figure 14 is a back view of the same in Figure 12;

Figure 15 is a side view of the same in Figure 12;

Figure 16 is a back view of the same slider means in Figure 8;

Figure 17 is a back view of a slider crown according to this invention;

Figure 18 is a side view of the same in Figure 17;

Figure 19 is a perspective view of an inner case according to this invention;

Figure 20 is a front view of the same in Figure 19;

Figure 21 is a top view showing a combination of a support base, sheet spring and stopper member according to this invention;

Figure 22 is a back view of the same in Figure 21;

Figure 23 is a perspective view of said stopper member;

Figure 24 is a partial back view showing said stopper member combined with said inner case;

Figure 25 is an enlarged view showing operation of said support base under working of said sheet spring;

Figure 26 is a perspective view of said clip; and

Figure 27 is a perspective view showing said clip mounted on the rear portion of said shoulder.

The knife comprises an elongate holder 1 having a generally C-shaped section having an upper wall 2, a lower wall 3, a rear wall 6 and a front upper wall 4 and a front lower wall 5. The front upper wall 4 and the front lower wall 5 together defining a longitudinal slot 10. The holder defines a cavity 8 adapted to receive a magazine 7 (see Figure 20) and the longitudinal slot 10 is provided on its lower surface with a plurality of zig-zag projections, each constituting a slider locking portion.

The rear portion of the back wall 6 has a short axially extending slot 13 terminating in a substantially square window 14 spaced forwardly of the rear end of the back wall. The upper wall 2 and the lower wall 3 also accommodate, spaced inwardly from the rearward end thereof, rectangular windows 15 in opposed relationship one with the other.

The slider 16 includes a crown 18 having a serrated outer portion 19 and a generally C-section terminating in spaced inwardly projected flanges 21, each flange having an inclined surface 20 towards one end thereof. The slider has a cut away portion

25 which accommodates a spring strip 33 which latter supports longitudinal spring strip 17 including hook portions 26, 27, 28 and 29 extending in a forward direction and folded generally outwardly thereof, the forward portion of the strip 17 being bent outwardly at the forward end. A pair of lugs 31 and 32 are disposed in generally axially spaced relationship and extend outwardly of the strip 17 on the side thereof opposite the bent portion 30. The strip 17 is secured to the slider 18 by means of spring strip 33 which is disposed in a generally U-shaped section as shown in Figure 8 located on the strip 17 by interposing portions 33' between hooks 26, 27 and extremities 33' on hooks 28 and 29. The strip 17 is, therefore, biased generally outwardly of the slider so that in the assembled position the strip 17 is biased interiorly of the holder.

The slider is mounted in groove 10 from the opening at the rearward end of holder 1. The upper wall 4 and the lower 5 of the front side of the holder are disposed between the strip 17 and the crown 18 of slider 16, while the arcuate portion 33' of spring 33 rests on slider locking portions 9 to guide the slider to an integer point by means of the arcuate portion 33' being biased between a pair of projections 9. Slider 16 can be moved by providing an axial force to the slider sufficient to urge spring 33 upwardly against its bias over the upper extremity of associated projection 9 so that the spring returns under its bias to engage the next recess in the slot in the holder.

The forward extremity of the groove 10 terminates the cutaway portion 11 defining a forward window. When the slider 16 is moved to its foremost position, the bent portion 30 of slider strip 17 extends through the window of the holder so that the inclined surface bears against the forward extremity of window 11. Continued forward movement deforms the strip outwardly of the window so that the forward lug 31 is moved outwardly with respect to its position of travel with the slider along the groove, thus disengaging from said blade.

The magazine 7 comprises a longitudinal inner case 35 having a forward end from which blade portions of associated blades are to be dispensed, and a rearward end accommodating a stopper member 38. The elongate case is substantially C-shaped section, is open on its front and has an upper wall, a lower wall and a side wall, the side wall supporting a pair of sheet springs 37 and a base support plate 36. A plurality of blades 34 are disposed in side by side relationship within the magazine between the support base plate

36 and the dependent limbs 41 and 44 from the upper wall 39 and the lower wall 40 respectively of the magazine case 35. The forward portion of the back wall 43 is provided with a triangular lug 46 to constitute a blade guide together with dependent front wall portions or flanges 41 and 42. The blades extend within the magazine with the cutting edge downwardly as shown in the drawings accompanying this specification. Each blade comprises a plurality of individual blade portions, each defined by a score line 34" extending transversely to the longitudinal axis of each blade and inclined at an angle of substantially 30°. The lower edge of the blade is sharpened as the cutting edge of the axial spacing of the score lines corresponds with the spacing of the projections 9 along the longitudinal groove in the holder 1.

The stopper member 38 is bifurcated towards the rearward end by means of a re-entrant slot 37. The bifurcated portion is provided with a pair of serrated portions 54, while a wedge-shaped piece 58 is also provided on each side of laterally extending projection 56. Forwardly of serrated portions 54 there is provided a wedge-shaped recess 54 and a central recess 52 adapted to co-operate with spade end 51 attached to support the base plate 36. The support base plate 36 is provided at its rearward end with a plurality of serrations on its rearward side and further carries sheet springs 37. Toward the rearward end of support base plate 36 there is provided a cut-out flap 50 carrying on the front face thereof a projection (see Figure 21).

The base plate 36 is entered into the magazine case 35 with a plurality of blades juxtaposed the front face, the rear end of each blade abutting the abutment 50. The backing plate is engaged with the stopper 38 by means of the interaction of spade portion 51 with corresponding co-operating recess 52 in stopper portion 38. The resulting assembly is then entered forwardly until the flap 48 on rear wall 43 of casing 35 engages with co-operating recess 53 in the back of stopper 38.

The magazine is then loaded and the springs 37 serve to bias the blade into contact with the flanges 41 and 42 thereby exposing the side of a blade in the manner shown.

Each blade is provided with a space or opening towards the rearward end thereof adapted to engage with the projection 31 on strip 17 of slider 16.

The end of the casing may be closed by means of a clip 59 having a U-shaped portion 16 comprising an independent clip 61. The side walls of U-shaped portion 16

are each provided with a blister 63 adapted to engage the holder to retain the same while the forward edge of the U-shaped portion in the base thereof is provided with a raised part 62 adapted to constitute a bar for engagement with a slot 10 of holder 1. The end face of clip 59 is provided with a slot 64 which extends into the base of the U-shaped part as shown in Figure 26.

The clip may be demounted by depressing the blisters 63 engaging windows 15 in the holder 1, the slot 64 may then be entered over the exposed portion of a blade portion 34 projecting from the forward end of the holder 1. A levering movement on the blade portion will result in fracture of the blade along its score line to break off and remove the blunt blade portion. The slider on loading of the magazine is moved to a position whereby the abutment or lug 31 of strip 17 is juxtaposed projection 50 of base plate 36, and abutment 32 of slider 16 is disposed rearwardly at the rear end of the blade. The spring pressure of lug 31 on engagement of abutment 50 serves to depress abutment 50 by deformation of the flap constituting abutment 50 to disengage abutment 50 from the opening in the blade to substitute therefor lug 31. Movement of the slider forwardly of the holder therefore results in advancement of the blade until the first trough in the zig-zag portion of the slot is reached. Interengagement by spring 33 with that trough serves to retain the slider in position and to expose the first cutting portion of blade 34. When blade portion 34 becomes dull or blunt, the blade portion can be broken off in the manner described above, the slider advanced until spring 33 engages the next depression in the zig-zag portion to expose the next blade portion for cutting. This sequence may be continued with renewable blade portions until the slider is at the forward position. In this case, the spring 30 enters window 11 at the forward end of the holder and further forward movement of the slider causes the bent portion 30 of strip 17 to move away from the interior cavity of the holder thereby disengaging lug 31 from the opening in the blade while abutment 32 still serves, where necessary, to urge the remnant of the blade forwardly of the holder. The blade remnant can then be removed longitudinally axially of the holder via the blade dispensing opening and the slider removed rearwardly to engage the next adjacent blade by depressing the abutment 50 in the manner described above; the springs 37 serving to urge base plate 36 laterally of the longitudinal axis to take up the space left by the discharged blade.

When all the spare blades in the magazine 7 have been used, the clip 59 can be removed and knobs 55, 56 may be depressed and moved backwards to remove magazine 7 for refilling with a supply of further blades.

WHAT WE CLAIM IS:

1. A knife comprising a plurality of dispensable blades each having a plurality of spaced parallel score lines disposed transversely thereof to define individual blade portions; a holder; a magazine adapted for insertion in said holder and including a case accommodating the dispensable blades in side by side relationship, said holder being open on one side to expose a side of the nearest blade; blade dispensing means carried by said holder; a support base and biasing means therefor to urge said nearest blade into operative engagement with said dispensing means.

2. A knife as claimed in claim 1 wherein the holder has a longitudinal slot and wherein the blade dispensing means constitutes a slider carried in said slot.

3. A knife as claimed in claim 2

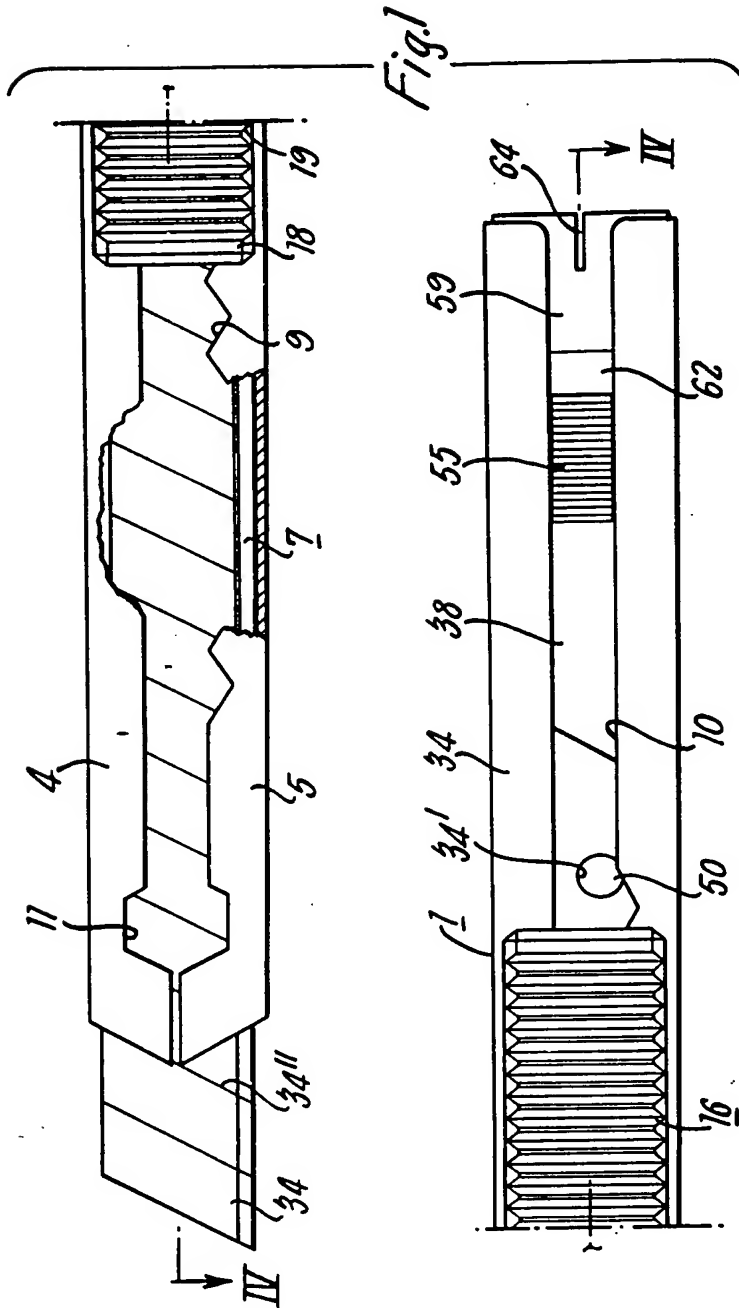
wherein the slider has a spring loaded abutment adapted to engage a blade for progressive dispensing of said blade in response to movement of said slider and means for depressing said spring loading at the forward extremity of the slider travel to disengage said abutment from said blade to permit removal of the spent blade from the holder.

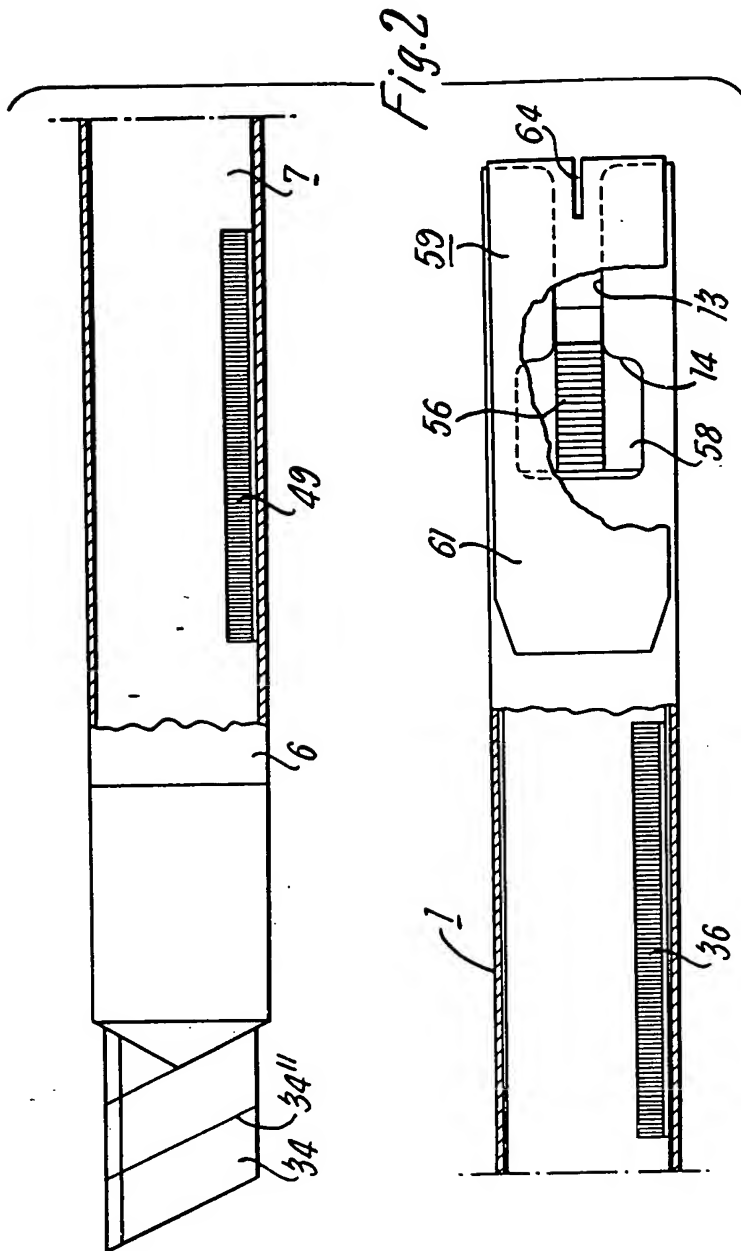
4. A knife as claimed in any preceding claim including a detachable clip mounted on the rear portion of said holder, said clip having a split or groove adapted to engage the blade for breaking a used blade portion along a score line prior to dispensing a new blade portion from the holder.

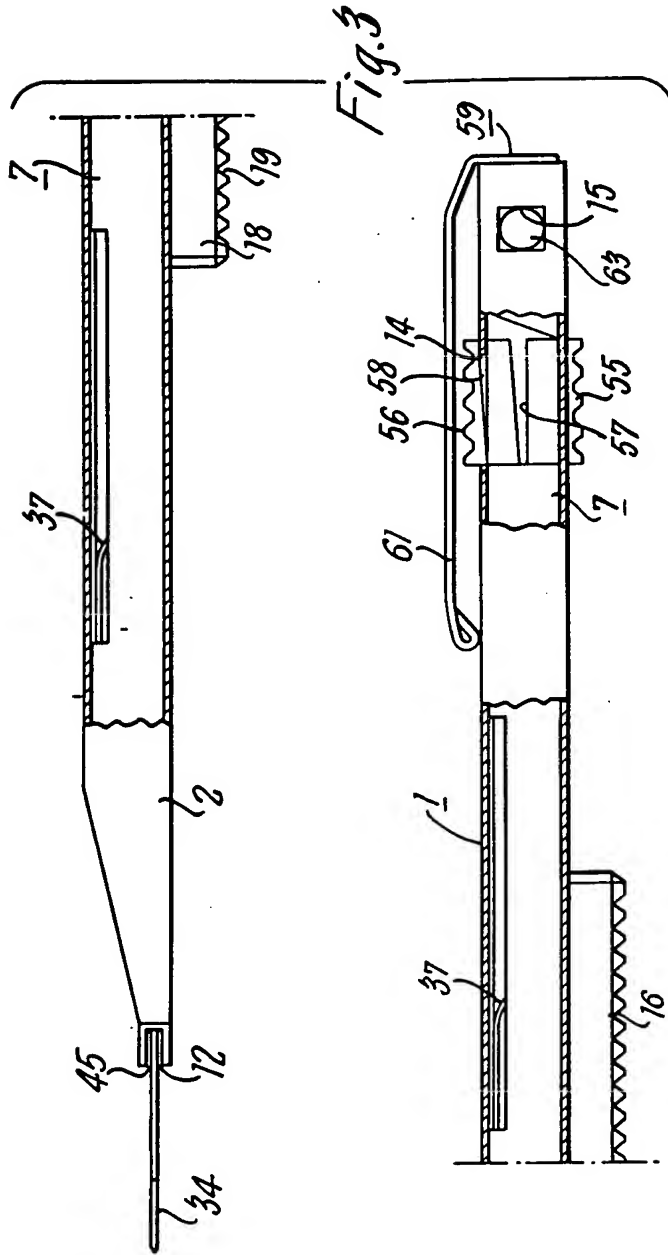
5. A knife substantially as herein described with reference to and as illustrated in Figures 1 to 27 of the accompanying drawings.

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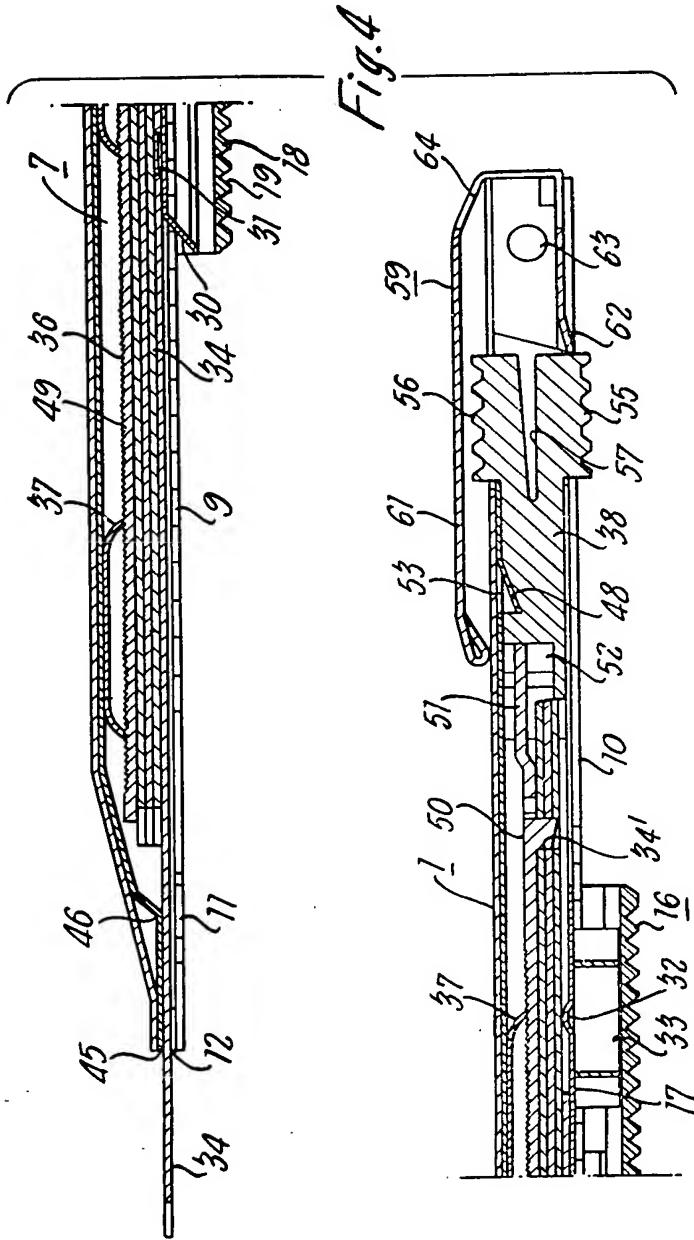
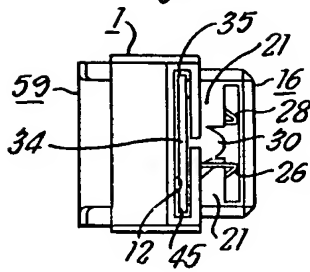
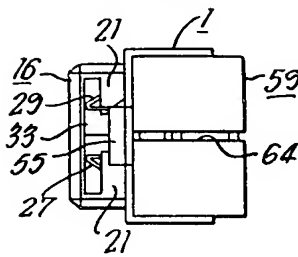
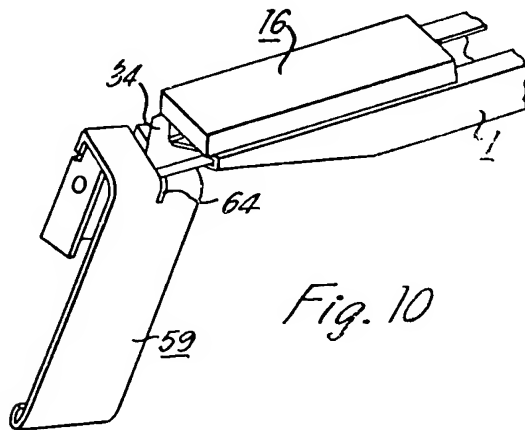
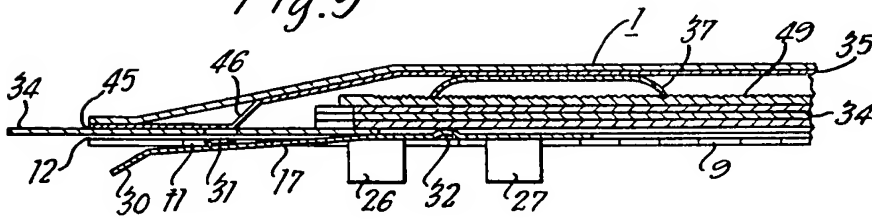
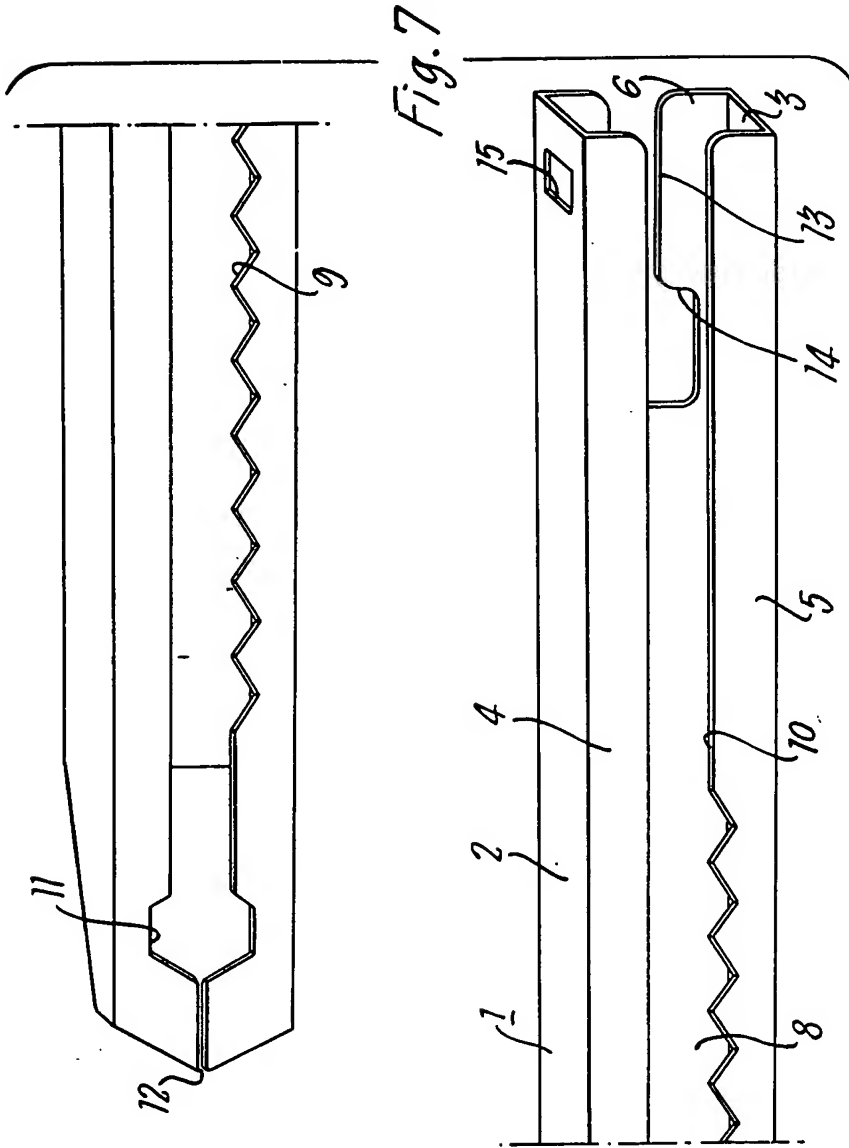
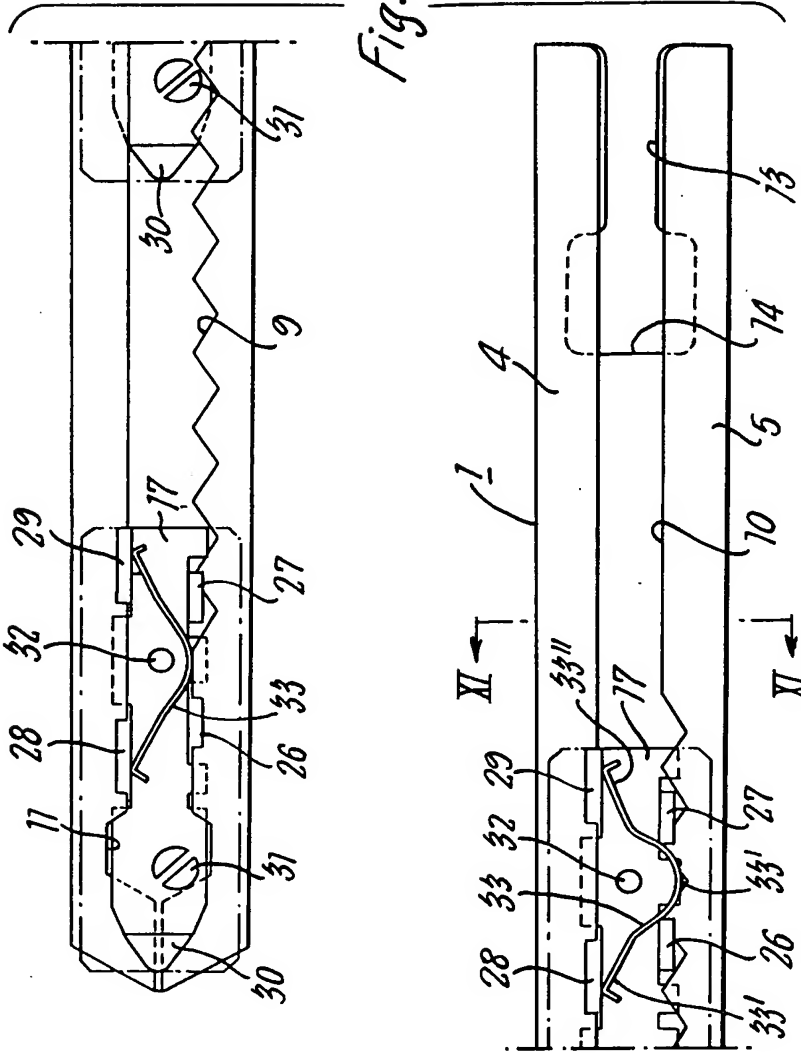
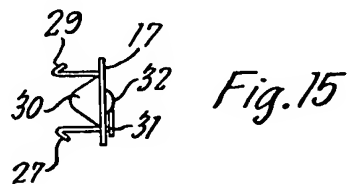
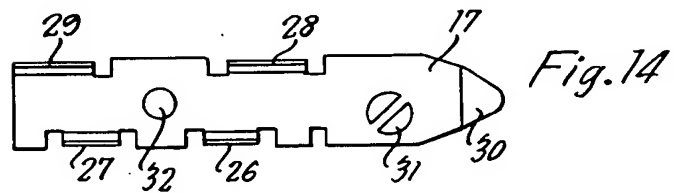
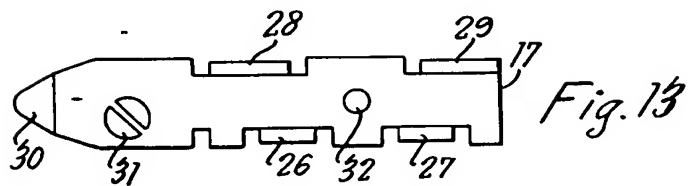
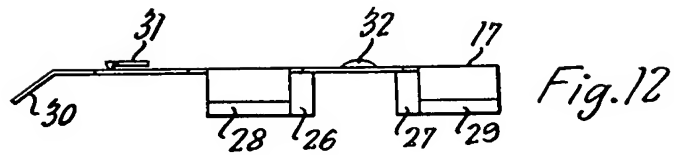
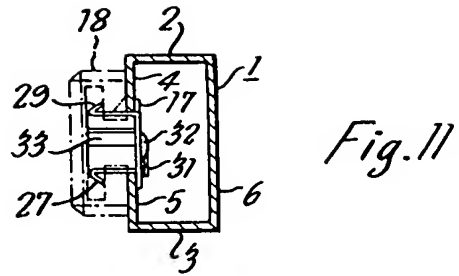
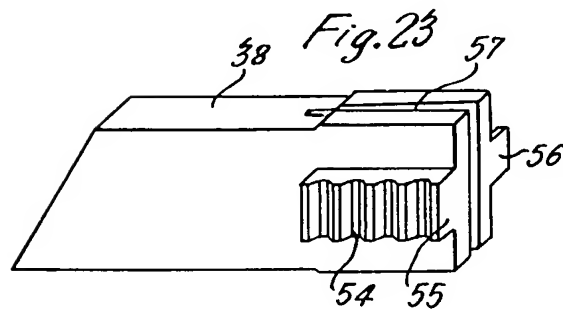
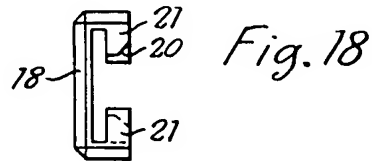
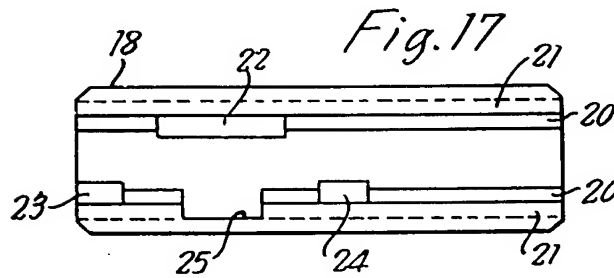
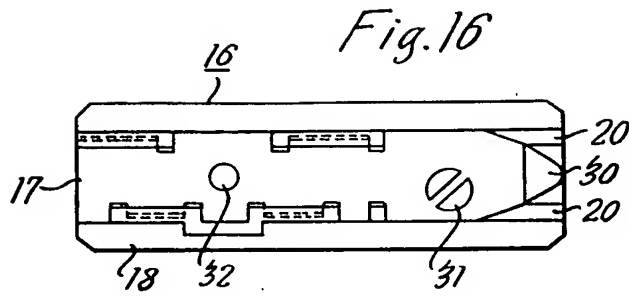


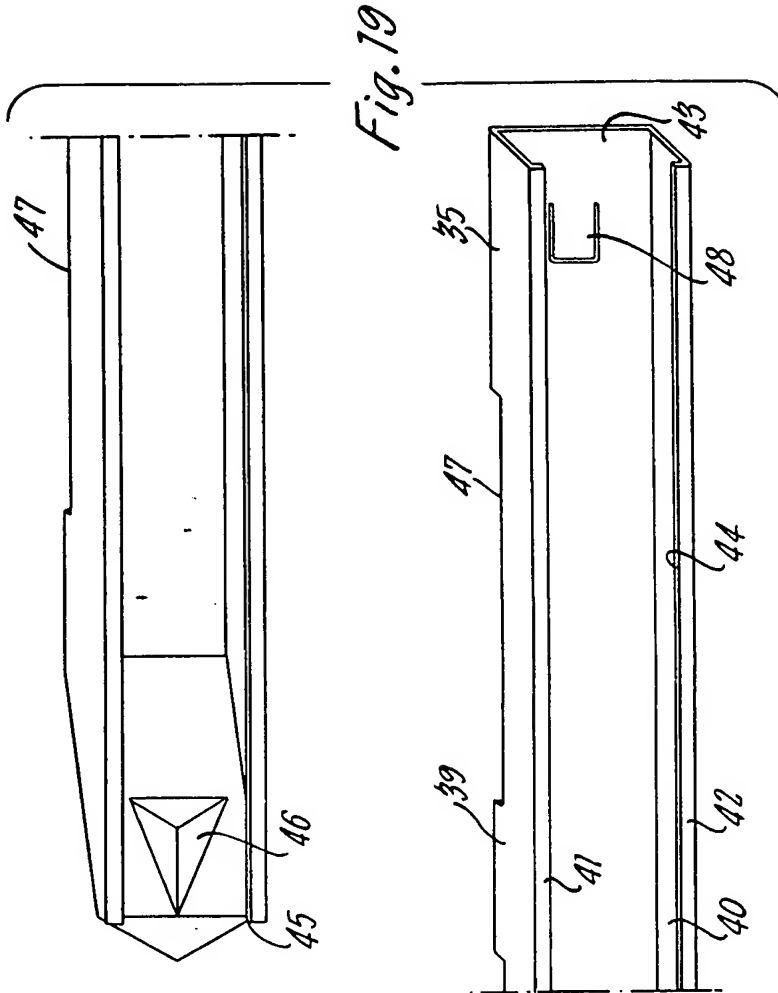
Fig. 5*Fig. 6**Fig. 9**Fig. 10*

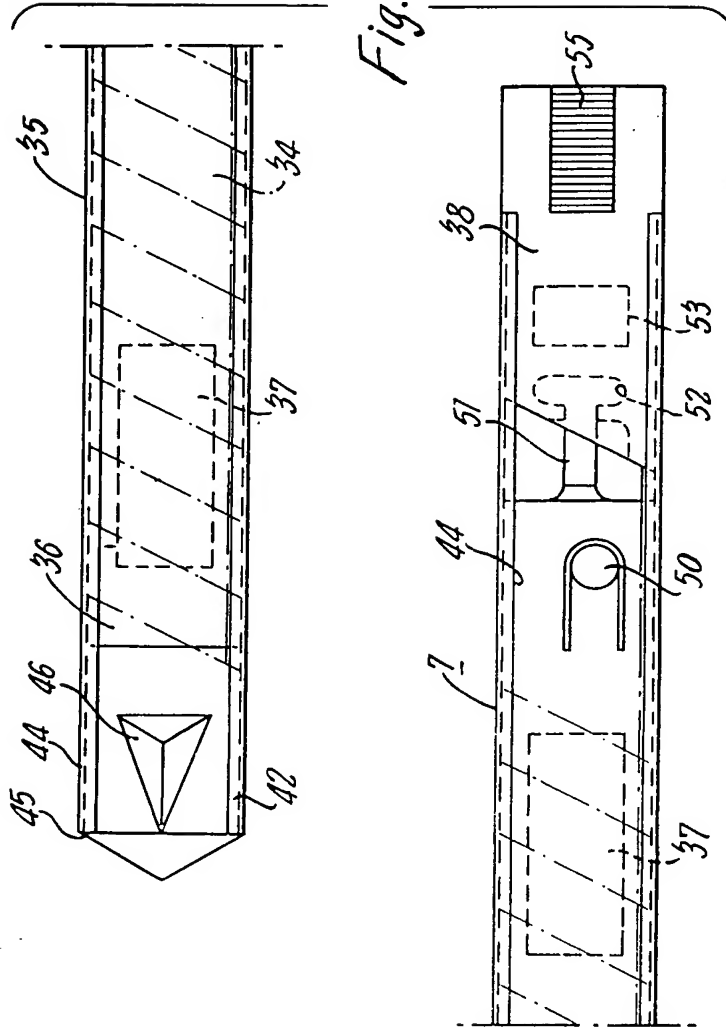












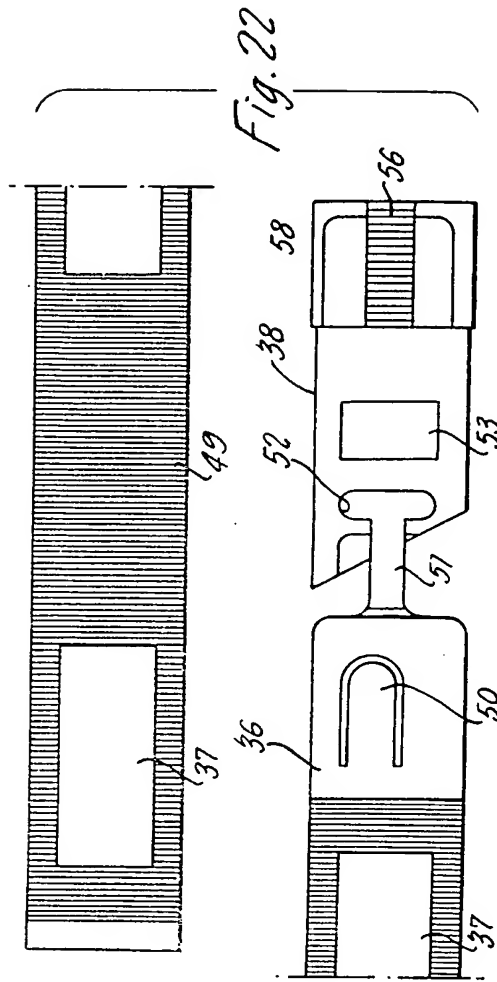
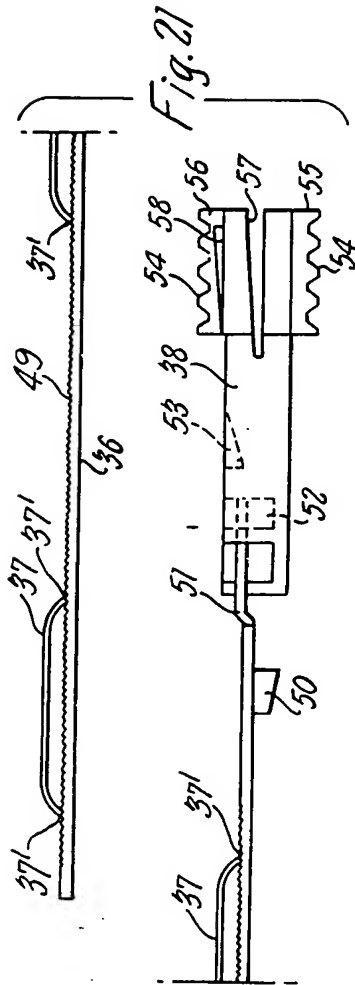


Fig. 24

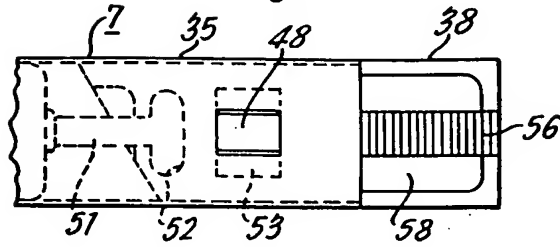


Fig. 25

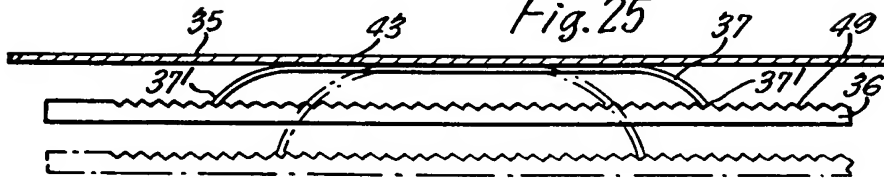


Fig. 26

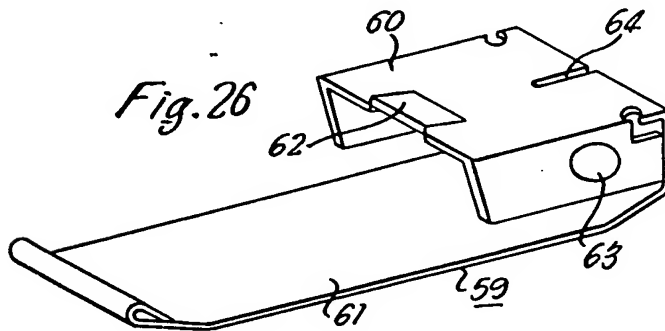


Fig. 27

